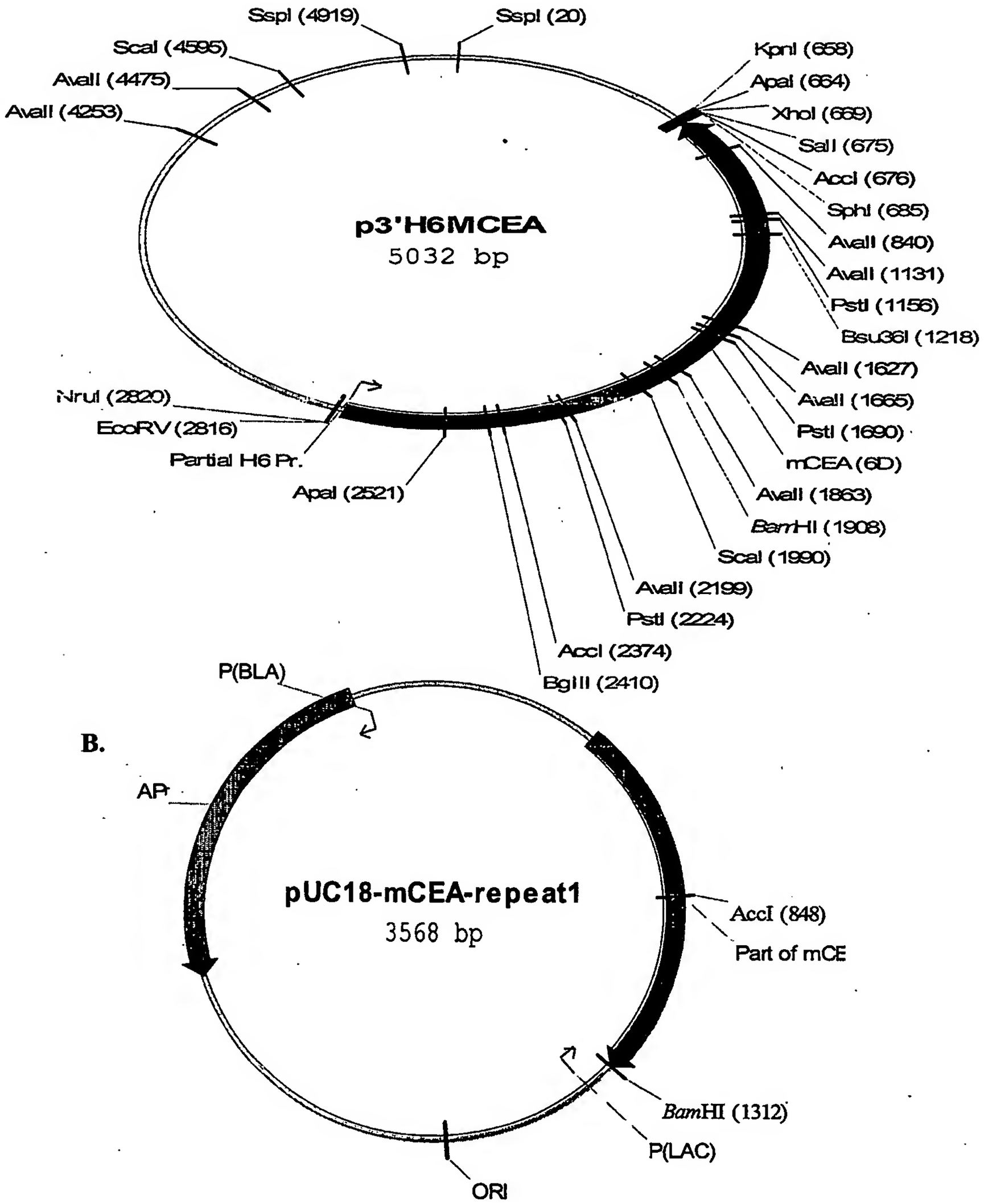
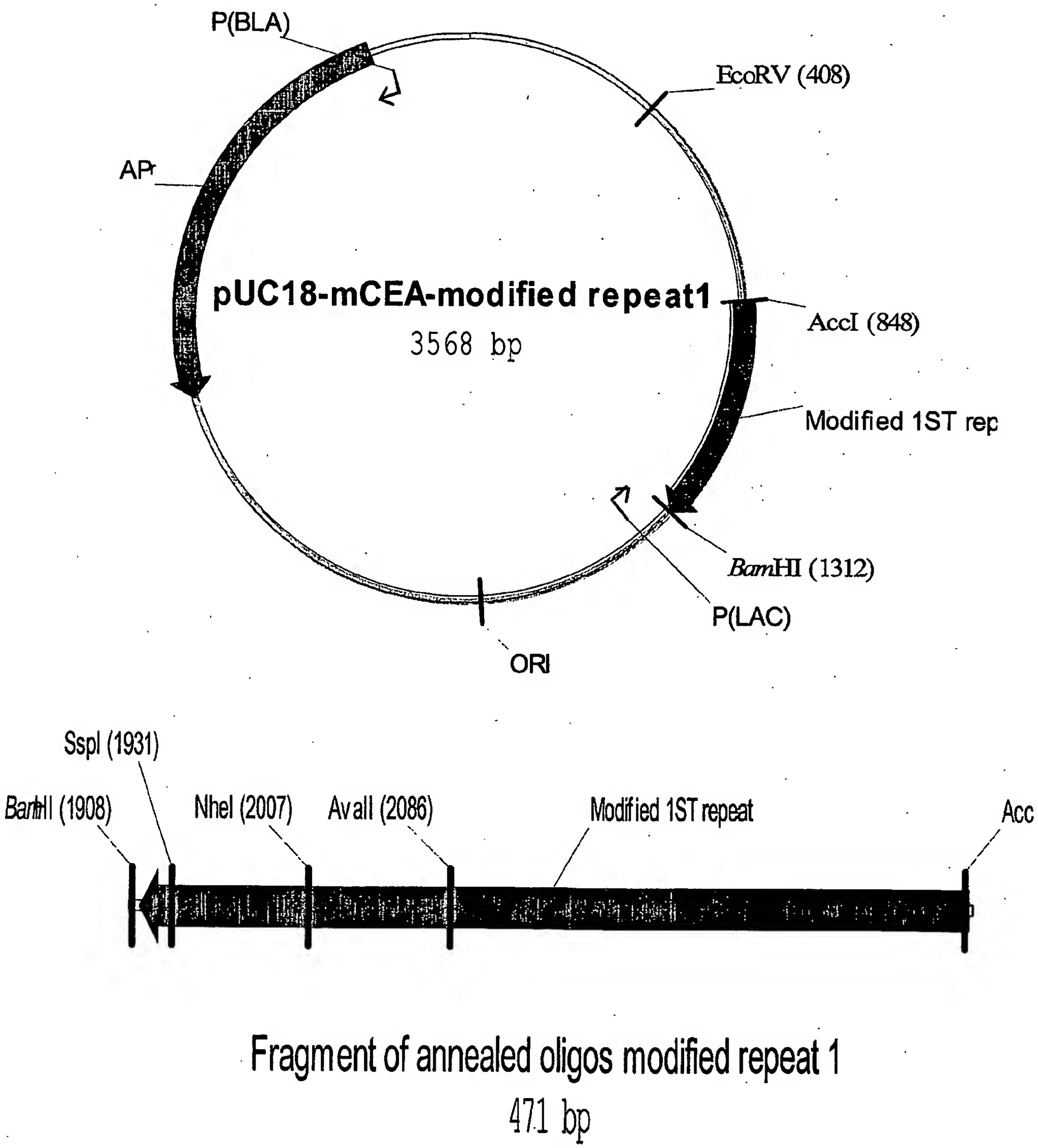
FIGURE 1

A.



B.

FIGURE 2



Fragment of annealed oligos modified repeat 1

471 bp

FIGURE 3

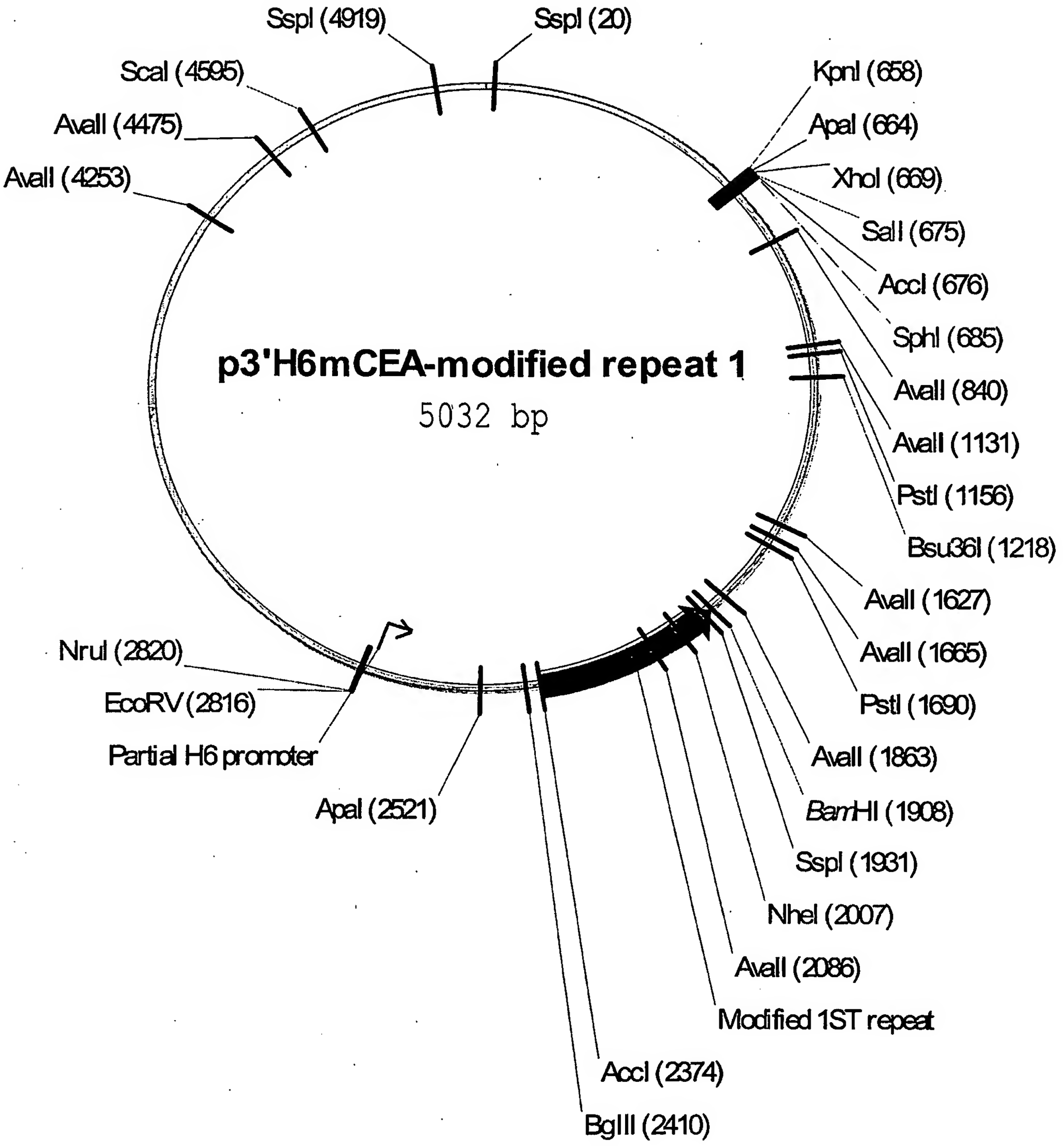

p3'H6mCEA-modified repeat 1
5032 bp
SspI (4919)
SspI (20)
ScaI (4595)
AvaII (4475)
AvaII (4253)
KpnI (658)
ApaI (664)
XhoI (669)
SalI (675)
AccI (676)
SphI (685)
AvaII (840)
AvaII (1131)
PstI (1156)
Bsu36I (1218)
AvaII (1627)
AvaII (1665)
PstI (1690)
AvaII (1863)
BamHI (1908)
SspI (1931)
NheI (2007)
AvaII (2086)
Modified 1ST repeat
NruI (2820)
EcoRV (2816)
Partial H6 promoter
ApaI (2521)
AccI (2374)
BglII (2410)

FIGURE 4

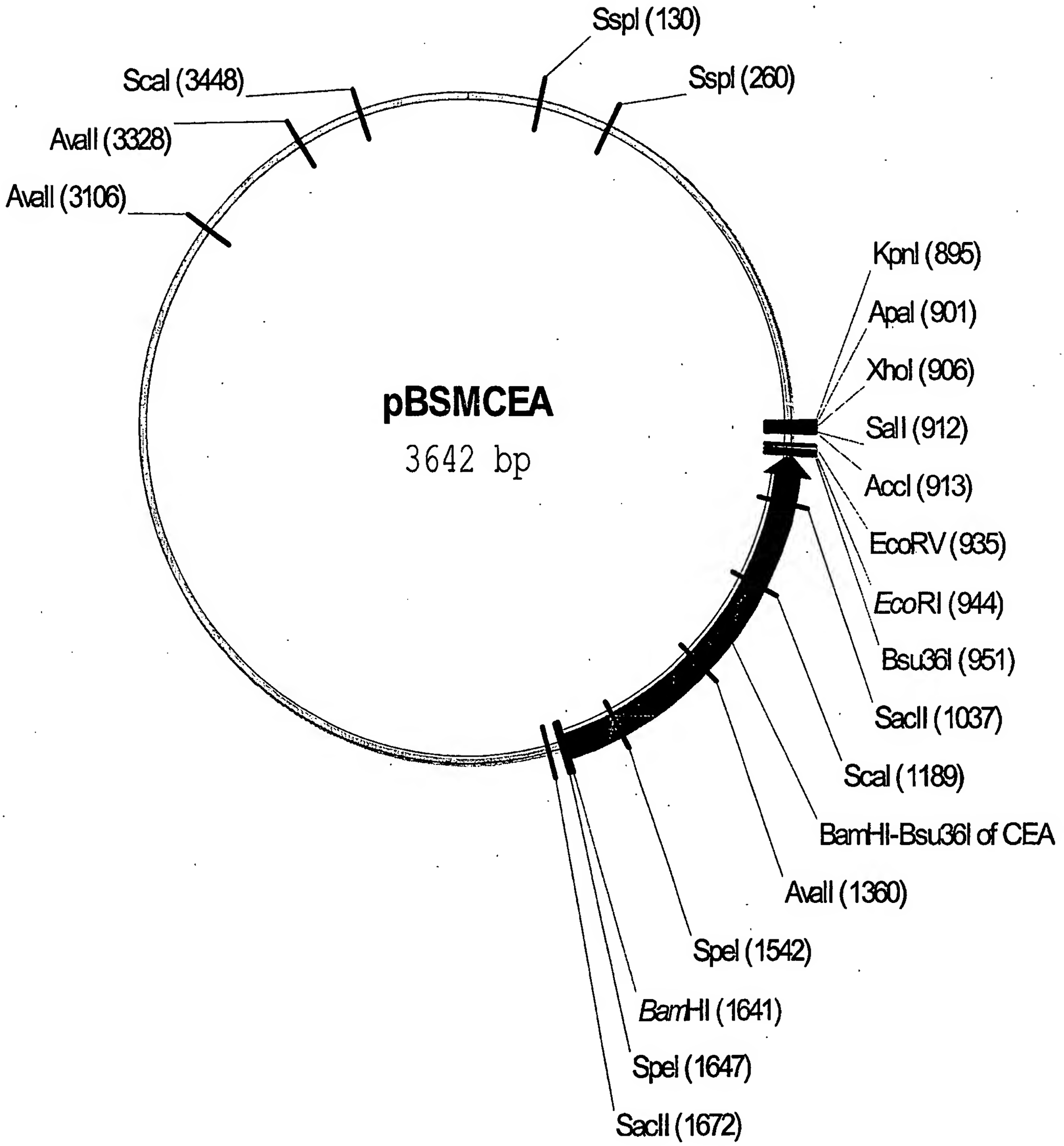
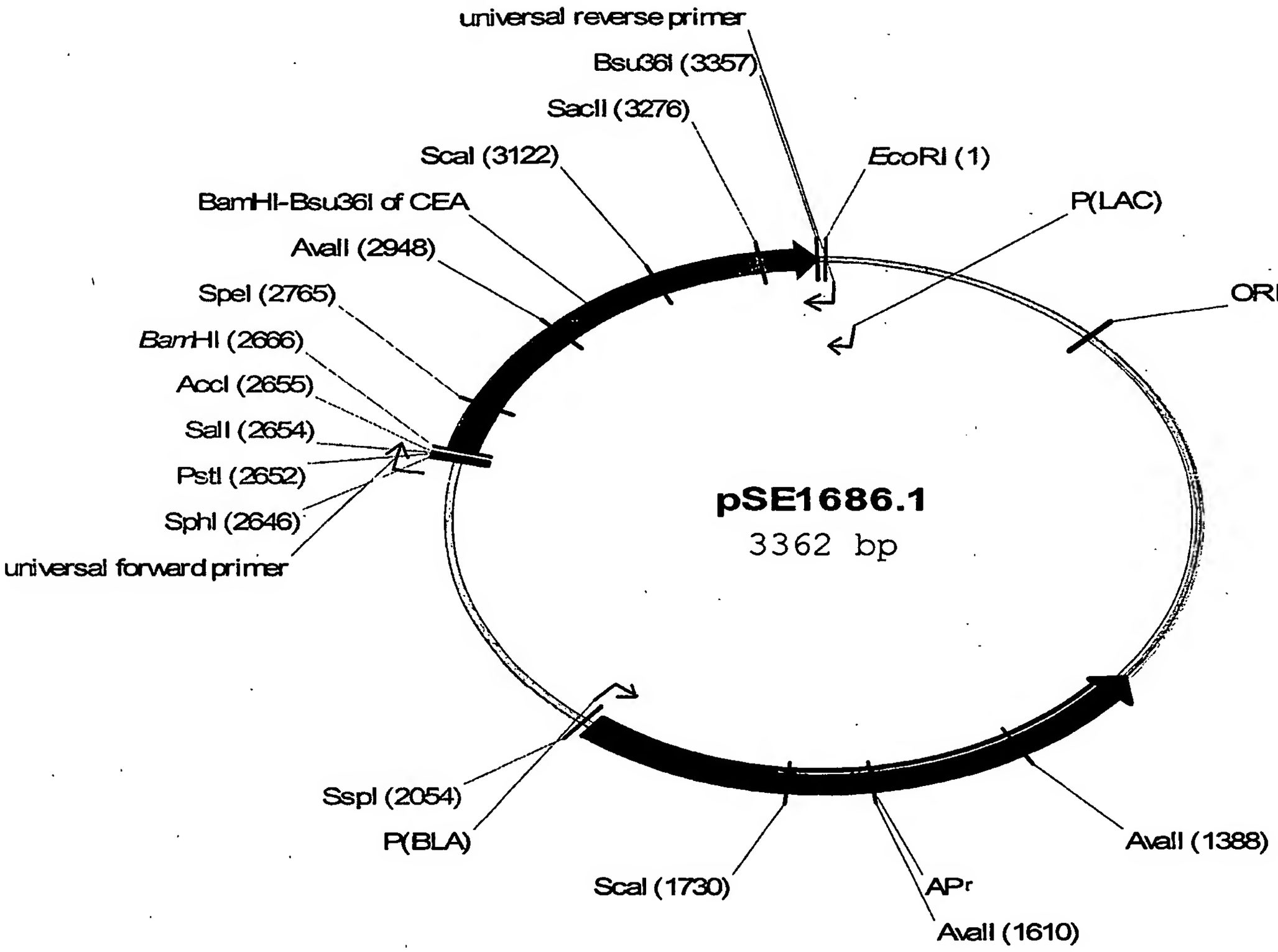
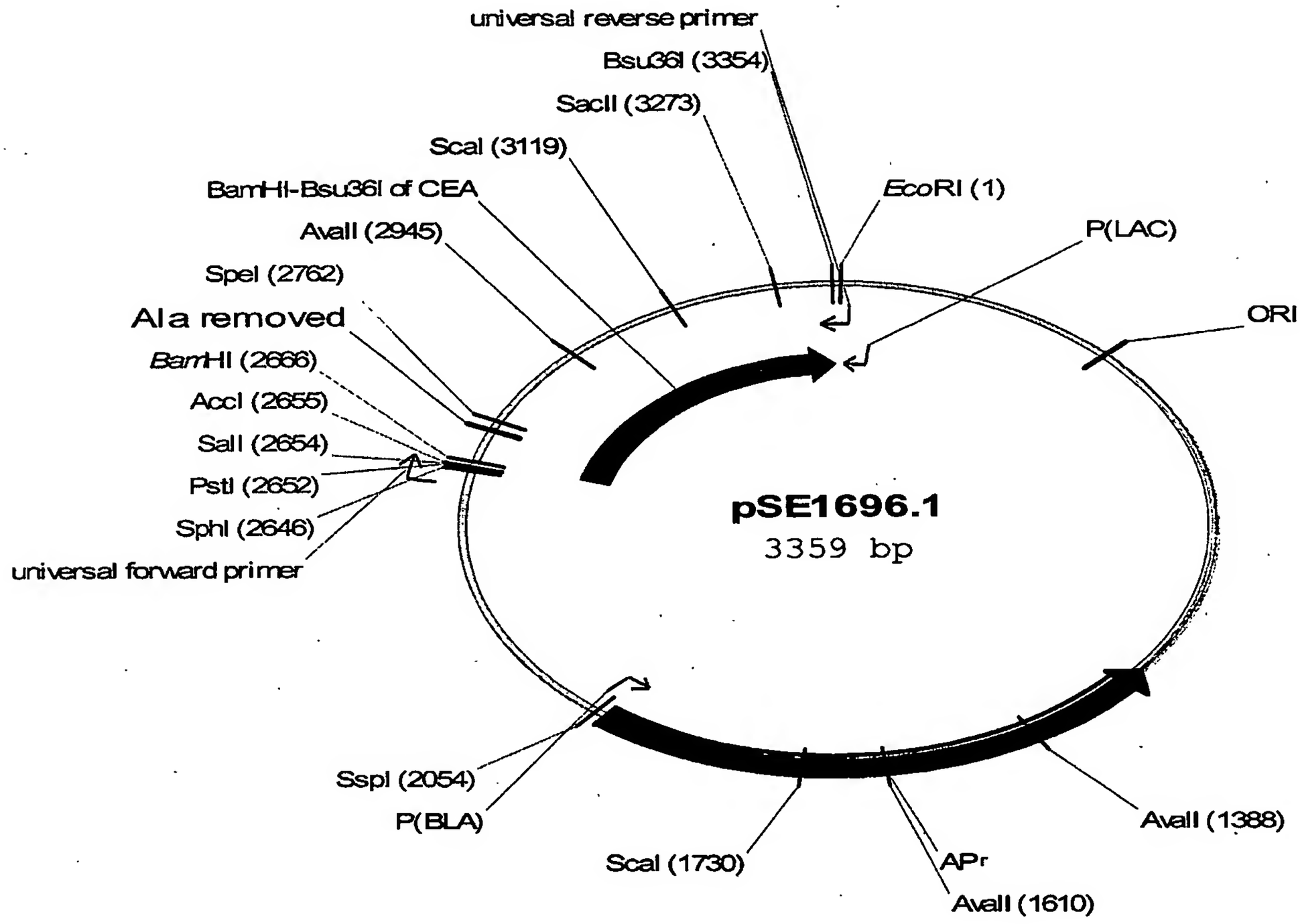

pBSMCEA
3642 bp
SspI (130)
SspI (260)
ScaI (3448)
AvaII (3328)
AvaII (3106)
KpnI (895)
ApaI (901)
XhoI (906)
SalI (912)
AccI (913)
EcoRV (935)
EcoRI (944)
Bsu36I (951)
SacII (1037)
ScaI (1189)
BamHI-Bsu36I of CEA
AvaII (1360)
SpeI (1542)
BamHI (1641)
SpeI (1647)
SacII (1672)

FIGURE 5



pUC18 mCEA modified repeat 2 (gsoe)

FIGURE 6



pUC18 mCEA modified repeat 2 gsoe minus Ala

FIGURE 7

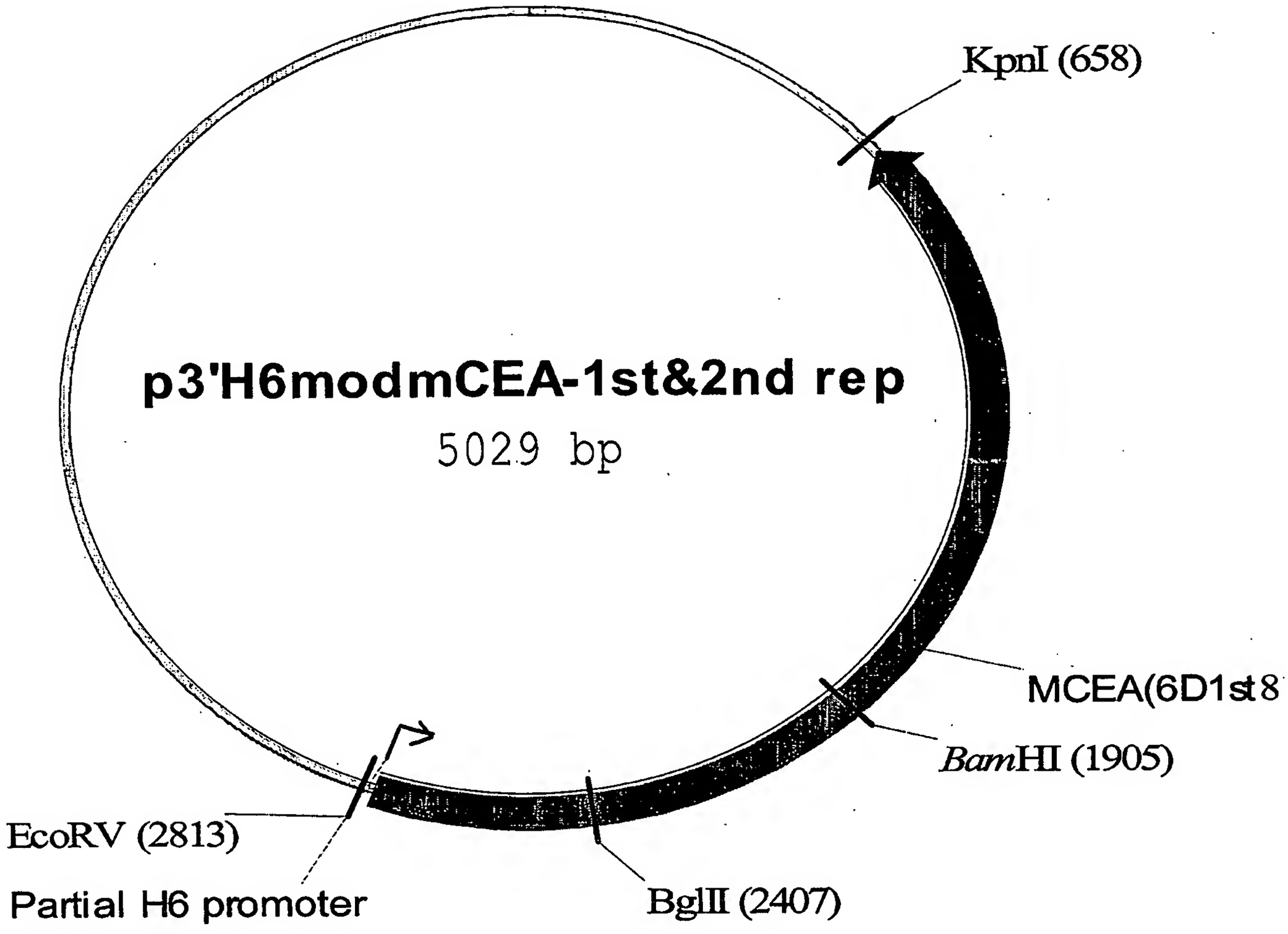

KpnI (658)
p3'H6modmCEA-1st&2nd rep
5029 bp
MCEA(6D1st8
BamHI (1905)
EcoRV (2813)
Partial H6 promoter
BglII (2407)

FIGURE 8

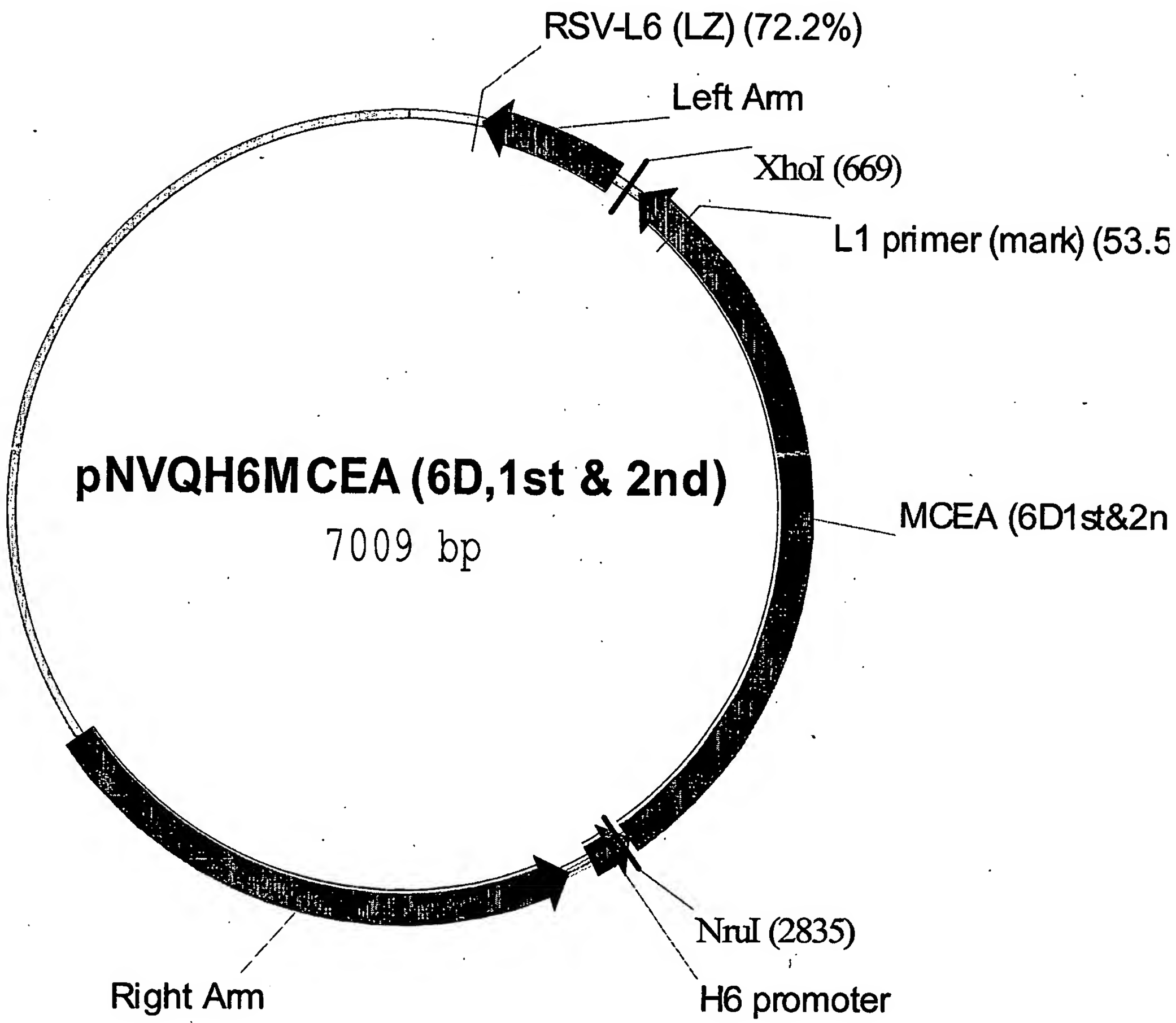

RSV-L6 (LZ) (72.2%)
Left Arm
XhoI (669)
L1 primer (mark) (53.5
pNVQH6MCEA (6D,1st & 2nd)
7009 bp
MCEA (6D1st&2n
NruI (2835)
Right Arm
H6 promoter

FIGURE 9A

```
                    1                                                  50
          mCEA(6D)  ATGGAGTCTC CCTCGGCCCC TCCCCACAGA TGGTGCATCC CCTGGCAGAG
mCEA(6D,1st&2nd)  ATGGAGTCTC CCTCGGCCCC TCCCCACAGA TGGTGCATCC CCTGGCAGAG

                   51                                                 100
          mCEA(6D)  GCTCCTGCTC ACAGCCTCAC TTCTAACCTT CTGGAACCCG CCCACCACTG
mCEA(6D,1st&2nd)  GCTCCTGCTC ACAGCCTCAC TTCTAACCTT CTGGAACCCG CCCACCACTG

                  101                                                 150
          mCEA(6D)  CCAAGCTCAC TATTGAATCC ACGCCGTTCA ATGTCGCAGA GGGGAAGGAG
mCEA(6D,1st&2nd)  CCAAGCTCAC TATTGAATCC ACGCCGTTCA ATGTCGCAGA GGGGAAGGAG

                  151                                                 200
          mCEA(6D)  GTGCTTCTAC TTGTCCACAA TCTGCCCCAG CATCTTTTTG GCTACAGCTG
mCEA(6D,1st&2nd)  GTGCTTCTAC TTGTCCACAA TCTGCCCCAG CATCTTTTTG GCTACAGCTG

                  201                                                 250
          mCEA(6D)  GTACAAAGGT GAAAGAGTGG ATGGCAACCG TCAAATTATA GGATATGTAA
mCEA(6D,1st&2nd)  GTACAAAGGT GAAAGAGTGG ATGGCAACCG TCAAATTATA GGATATGTAA

                  251                                                 300
          mCEA(6D)  TAGGAACTCA ACAAGCTACC CCAGGGCCCG CATACAGTGG TCGAGAGATA
mCEA(6D,1st&2nd)  TAGGAACTCA ACAAGCTACC CCAGGGCCCG CATACAGTGG TCGAGAGATA

                  301                                                 350
          mCEA(6D)  ATATACCCCA ATGCATCCCT GCTGATCCAG AACATCATCC AGAATGACAC
mCEA(6D,1st&2nd)  ATATACCCCA ATGCATCCCT GCTGATCCAG AACATCATCC AGAATGACAC

                  351                                                 400
          mCEA(6D)  AGGATTCTAC ACCCTACACG TCATAAAGTC AGATCTTGTG AATGAAGAAG
mCEA(6D,1st&2nd)  AGGATTCTAC ACCCTACACG TCATAAAGTC AGATCTTGTG AATGAAGAAG

                  401                                                 450
          mCEA(6D)  CAACTGGCCA GTTCCGGGTA TACCCGGAGC TGCCCAAGCC CTCCATCTCC
mCEA(6D,1st&2nd)  CAACTGGCCA GTTCCGGGTA TACCCGGAAC TCCCTAAGCC TTCTATTAGC

                  451                                                 500
          mCEA(6D)  AGCAACAACT CCAAACCCGT GGAGGACAAG GATGCTGTGG CCTTCACCTG
mCEA(6D,1st&2nd)  TCCAATAATA GTAAGCCTGT CGAAGACAAA GATGCCGTCG CTTTTACATG

                  501                                                 550
          mCEA(6D)  TGAACCTGAG ACTCAGGACG CAACCTACCT GTGGTGGGTA AACAATCAGA
mCEA(6D,1st&2nd)  CGAGCCCGAA ACTCAAGACG CAACATATCT CTGGTGGGTG AACAACCAGT

                  551                                                 600
          mCEA(6D)  GCCTCCCGGT CAGTCCCAGG CTGCAGCTGT CCAATGGCAA CAGGACCCTC
mCEA(6D,1st&2nd)  CCCTGCCTGT GTCCCCTAGA CTCCAACTCA GCAACGGAAA TAGAACTCTG

                  601                                                 650
          mCEA(6D)  ACTCTATTCA ATGTCACAAG AAATGACACA GCAAGCTACA AATGTGAAAC
mCEA(6D,1st&2nd)  ACCCTGTTTA ACGTGACCAG GAACGACACA GCAAGCTACA AATGCGAAAC
```

FIGURE 9B

```
                    651                                                 700
          mCEA(6D)  CCAGAACCCA GTGAGTGCCA GGCGCAGTGA TTCAGTCATC CTGAATGTCC
mCEA(6D,1st&2nd)  CCAAAATCCA GTCAGCGCCA GGAGGTCTGA TTCAGTGATT CTCAACGTGC

                    701                                                 750
          mCEA(6D)  TCTATGGCCC GGATGCCCCC ACCATTTCCC CTCTAAACAC ATCTTACAGA
mCEA(6D,1st&2nd)  TTTACGGACC CGATGCTCCT ACAATCAGCC CTCTAAACAC AAGCTATAGA

                    751                                                 800
          mCEA(6D)  TCAGGGGAAA ATCTGAACCT CTCCTGCCAC GCAGCCTCTA ACCCACCTGC
mCEA(6D,1st&2nd)  TCAGGGGAAA ATCTGAATCT GAGCTGTCAT GCCGCTAGCA ATCCTCCCGC

                    801                                                 850
          mCEA(6D)  ACAGTACTCT TGGTTTGTCA ATGGGACTTT CCAGCAATCC ACCCAAGAGC
mCEA(6D,1st&2nd)  CCAATACAGC TGGTTTGTCA ATGGCACTTT CCAACAGTCC ACCCAGGAAC

                    851                                                 900
          mCEA(6D)  TCTTTATCCC CAACATCACT GTGAATAATA GTGGATCCTA TACGTGCCAA
mCEA(6D,1st&2nd)  TGTTCATTCC CAATATTACC GTGAACAATA GTGGATCCTA CACGTGCCAA

                    901                                                 950
          mCEA(6D)  GCCCATAACT CAGACACTGG CCTCAATAGG ACCACAGTCA CGACGATCAC
mCEA(6D,1st&2nd)  GCTCACAATA GCGACACCGG ACTCAACCGC ACAACCGTGA CGACGATTAC

                    951                                                1000
          mCEA(6D)  AGTCTATGAG CCACCCAAAC CCTTCATCAC CAGCAACAAC TCCAACCCCG
mCEA(6D,1st&2nd)  CGTGTATGAG CCACCAAAAC CATTCATAAC TAGTAACAAT TCTAACCCAG

                   1001                                                1050
          mCEA(6D)  TGGAGGATGA GGATGCTGTA GCCTTAACCT GTGAACCTGA GATTCAGAAC
mCEA(6D,1st&2nd)  TTGAGGATGA GGACGCAGTT GCATTAACTT GTGAGCCAGA GATTCAAAAT

                   1051                                                1100
          mCEA(6D)  ACAACCTACC TGTGGTGGGT AAATAATCAG AGCCTCCCGG TCAGTCCCAG
mCEA(6D,1st&2nd)  ACCACTTATT TATGGTGGGT CAATAACCAA AGTTTGCCGG TTAGCCCACG

                   1101                                                1150
          mCEA(6D)  GCTGCAGCTG TCCAATGACA ACAGGACCCT CACTCTACTC AGTGTCACAA
mCEA(6D,1st&2nd)  CTTGCAGTTG TCTAATGATA ACCGCACATT GACACTCCTG TCCGTTACTC

                   1151                                                1200
          mCEA(6D)  GGAATGATGT AGGACCCTAT GAGTGTGGAA TCCAGAACGA ATTAAGTGTT
mCEA(6D,1st&2nd)  GCAATGATGT AGGACCTTAT GAGTGTGGCA TTCAGAATGA ATTATCCGTT

                   1201                                                1250
          mCEA(6D)  GACCACAGCG ACCCAGTCAT CCTGAATGTC CTCTATGGCC CAGACGACCC
mCEA(6D,1st&2nd)  GATCACTCCG ACCCTGTTAT CCTTAATGTT TTGTATGGCC CAGACGACCC

                   1251                                                1300
          mCEA(6D)  CACCATTTCC CCCTCATACA CCTATTACCG TCCAGGGGTG AACCTCAGCC
mCEA(6D,1st&2nd)  AACTATATCT CCATCATACA CCTACTACCG TCCCGGCGTG AACTTGAGCC
```

FIGURE 9C

```
                    1301                                                1350
          mCEA(6D)  TCTCCTGCCA TGCAGCCTCT AACCCACCTG CACAGTATTC TTGGCTGATT
mCEA(6D,1st&2nd)    TTTCTTGCCA TGCAGCATCC AACCCCCCTG CACAGTACTC CTGGCTGATT

                    1351                                                1400
          mCEA(6D)  GATGGGAACA TCCAGCAACA CACACAAGAG CTCTTTATCT CCAACATCAC
mCEA(6D,1st&2nd)    GATGGAAACA TTCAGCAGCA TACTCAAGAG TTATTTATAA GCAACATAAC

                    1401                                                1450
          mCEA(6D)  TGAGAAGAAC AGCGGACTCT ATACCTGCCA GGCCAATAAC TCAGCCAGTG
mCEA(6D,1st&2nd)    TGAGAAGAAC AGCGGACTCT ATACTTGCCA GGCCAATAAC TCAGCCAGTG

                    1451                                                1500
          mCEA(6D)  GCCACAGCAG GACTACAGTC AAGACAATCA CAGTCTCTGC GGAGCTGCCC
mCEA(6D,1st&2nd)    GTCACAGCAG GACTACAGTT AAAACAATAA CTGTTCCGC GGAGCTGCCC

                    1501                                                1550
          mCEA(6D)  AAGCCCTCCA TCTCCAGCAA CAACTCCAAA CCCGTGGAGG ACAAGGATGC
mCEA(6D,1st&2nd)    AAGCCCTCCA TCTCCAGCAA CAACTCCAAA CCCGTGGAGG ACAAGGATGC

                    1551                                                1600
          mCEA(6D)  TGTGGCCTTC ACCTGTGAAC CTGAGGCTCA GAACACAACC TACCTGTGGT
mCEA(6D,1st&2nd)    TGTGGCCTTC ACCTGTGAAC CTGAGGCTCA GAACACAACC TACCTGTGGT

                    1601                                                1650
          mCEA(6D)  GGGTAAATGG TCAGAGCCTC CCAGTCAGTC CCAGGCTGCA GCTGTCCAAT
mCEA(6D,1st&2nd)    GGGTAAATGG TCAGAGCCTC CCAGTCAGTC CCAGGCTGCA GCTGTCCAAT

                    1651                                                1700
          mCEA(6D)  GGCAACAGGA CCCTCACTCT ATTCAATGTC ACAAGAAATG ACGCAAGAGC
mCEA(6D,1st&2nd)    GGCAACAGGA CCCTCACTCT ATTCAATGTC ACAAGAAATG ACGCAAGAGC

                    1701                                                1750
          mCEA(6D)  CTATGTATGT GGAATCCAGA ACTCAGTGAG TGCAAACCGC AGTGACCCAG
mCEA(6D,1st&2nd)    CTATGTATGT GGAATCCAGA ACTCAGTGAG TGCAAACCGC AGTGACCCAG

                    1751                                                1800
          mCEA(6D)  TCACCCTGGA TGTCCTCTAT GGGCCGGACA CCCCCATCAT TTCCCCCCCA
mCEA(6D,1st&2nd)    TCACCCTGGA TGTCCTCTAT GGGCCGGACA CCCCCATCAT TTCCCCCCCA

                    1801                                                1850
          mCEA(6D)  GACTCGTCTT ACCTTTCGGG AGCGGACCTC AACCTCTCCT GCCACTCGGC
mCEA(6D,1st&2nd)    GACTCGTCTT ACCTTTCGGG AGCGGACCTC AACCTCTCCT GCCACTCGGC

                    1851                                                1900
          mCEA(6D)  CTCTAACCCA TCCCCGCAGT ATTCTTGGCG TATCAATGGG ATACCGCAGC
mCEA(6D,1st&2nd)    CTCTAACCCA TCCCCGCAGT ATTCTTGGCG TATCAATGGG ATACCGCAGC

                    1901                                                1950
          mCEA(6D)  AACACACACA AGTTCTCTTT ATCGCCAAAA TCACGCCAAA TAATAACGGG
mCEA(6D,1st&2nd)    AACACACACA AGTTCTCTTT ATCGCCAAAA TCACGCCAAA TAATAACGGG
```

FIGURE 9D

```
                        1951                                                2000
            mCEA(6D)    ACCTATGCCT GTTTTGTCTC TAACTTGGCT ACTGGCCGCA ATAATTCCAT
mCEA(6D,1st&2nd)        ACCTATGCCT GTTTTGTCTC TAACTTGGCT ACTGGCCGCA ATAATTCCAT

                        2001                                                2050
            mCEA(6D)    AGTCAAGAGC ATCACAGTCT CTGCATCTGG AACTTCTCCT GGTCTCTCAG
mCEA(6D,1st&2nd)        AGTCAAGAGC ATCACAGTCT CTGCATCTGG AACTTCTCCT GGTCTCTCAG

                        2051                                                2100
            mCEA(6D)    CTGGGGCCAC TGTCGGCATC ATGATTGGAG TGCTGGTTGG GGTTGCTCTG
mCEA(6D,1st&2nd)        CTGGGGCCAC TGTCGGCATC ATGATTGGAG TGCTGGTTGG GGTTGCTCTG

                        2101
            mCEA(6D)    ATATAG
mCEA(6D,1st&2nd)        ATATAG
```

FIGURE 10

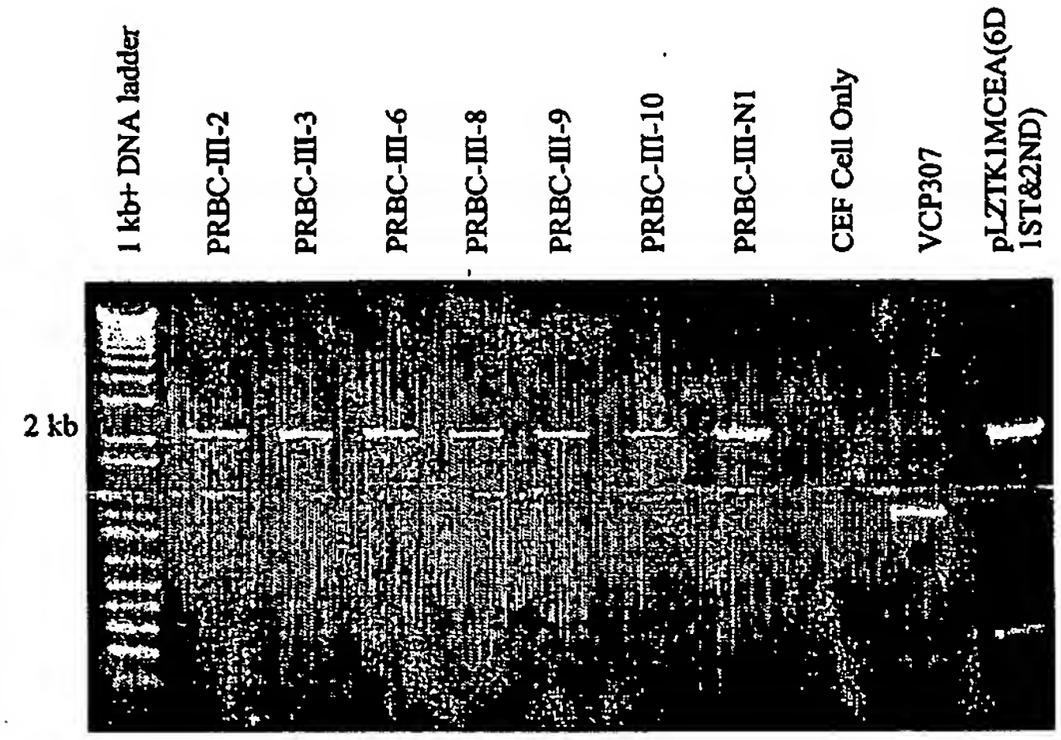

1 kb+ DNA ladder
PRBC-III-2
PRBC-III-3
PRBC-III-6
PRBC-III-8
PRBC-III-9
PRBC-III-10
PRBC-III-N1
CEF Cell Only
VCP307
pLZTK1MCEA(6D 1ST&2ND)
2 kb

FIGURE 11

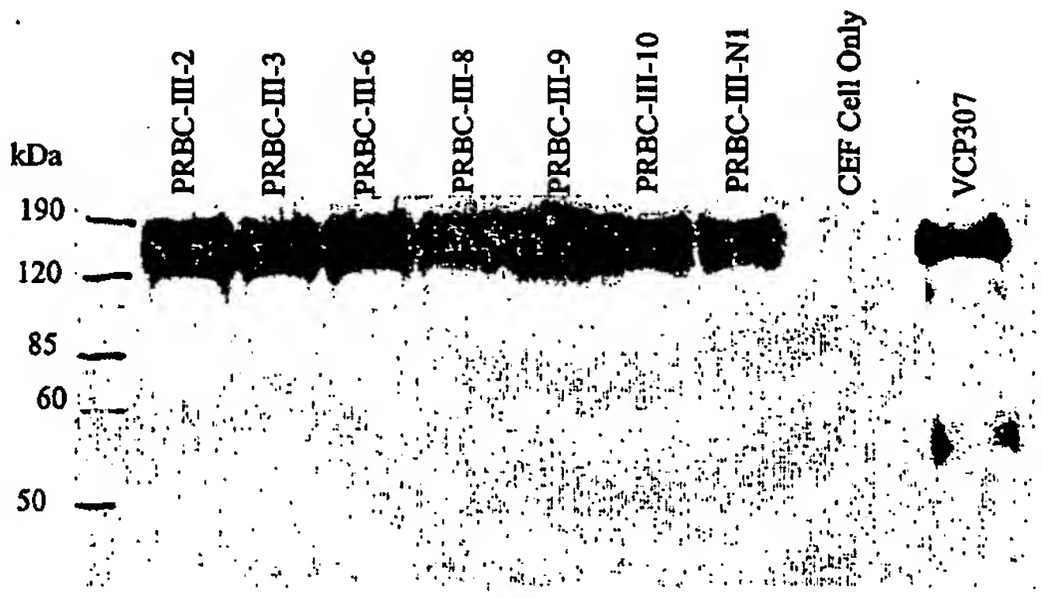
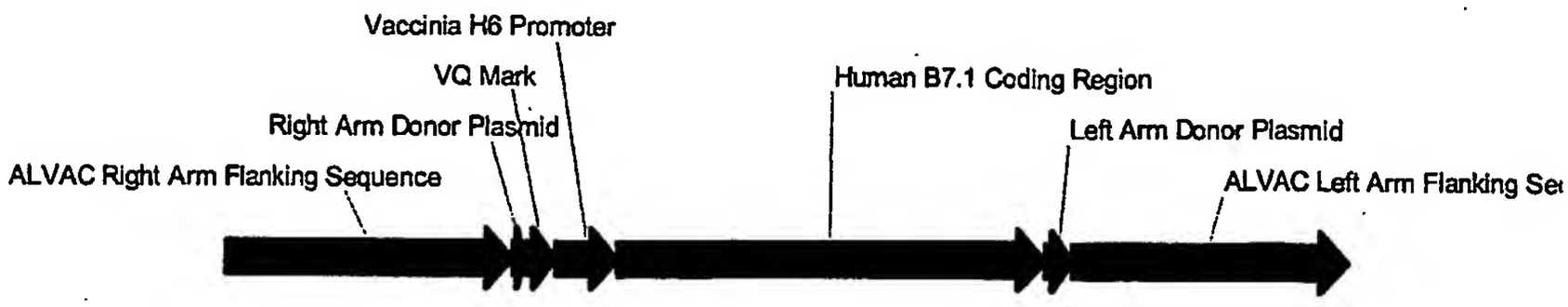

kDa
190
120
85
60
50
PRBC-III-2
PRBC-III-3
PRBC-III-6
PRBC-III-8
PRBC-III-9
PRBC-III-10
PRBC-III-N1
CEF Cell Only
VCP307

FIGURE 12



ALVAC Right Arm Flanking Sequence

```
                                                            ~~~~~~~~~~
   1    TTAGATTGTG TTATTCATTA CATAGACGCT GCTAAATCTA CTATCGATTT
        AATCTAACAC AATAAGTAAT GTATCTGCGA CGATTTAGAT GATAGCTAAA

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
  51    AGAGATAGTA TCTCTACTAC CCACAAAAAG AACTAAAGAC GCCATAGTGT
        TCTCTATCAT AGAGATGATG GGTGTTTTTC TTGATTTCTG CGGTATCACA

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
 101    ACTGGCCTAT AATAAAAGAC GCGTTGATAA GAGCTGTTCT GGAACGTGGT
        TGACCGGATA TTATTTTCTG CGCAACTATT CTCGACAAGA CCTTGCACCA

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
 151    GTTAAACTTA GAATACTACT AGGTTATTGG AAAAAGACCG ATATTATCTC
        CAATTTGAAT CTTATGATGA TCCAATAACC TTTTTCTGGC TATAATAGAG

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
 201    TAAAGCTTCT ATCAAAAGTC TTAATGAGTT AGGTGTAGAT AGTATAGATA
        ATTTCGAAGA TAGTTTTCAG AATTACTCAA TCCACATCTA TCATATCTAT

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
 251    TTACTACAAA GGTATTCATA TTTCCTATCA ATTCTAAAGT AGATGATATT
        AATGATGTTT CCATAAGTAT AAAGGATAGT TAAGATTTCA TCTACTATAA

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
 301    AATAACTCAA AGATGATGAT AGTAGATAAT AGATACGCTC ATATAATGAC
        TTATTGAGTT TCTACTACTA TCATCTATTA TCTATGCGAG TATATTACTG

                ALVAC Right Arm Flanking Sequence
        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
 351    TGCAAATTTG GACGGTTCAC ATTTTAATCA TCACGCGTTC ATAAGTTTCA
        ACGTTTAAAC CTGCCAAGTG TAAAATTAGT AGTGCGCAAG TATTCAAAGT
```

ALVAC Right Arm Flanking Sequence

401 ACTGCATAGA TCAAAATCTC ACTAAAAAGA TAGCCGATGT ATTTGAGAGA
TGACGTATCT AGTTTTAGAG TGATTTTTCT ATCGGCTACA TAAACTCTCT

ALVAC Right Arm Flanking Sequence

451 GATTGGACAT CTAACTACGC TAAAGAAATT ACAGTTATAA ATAATACATA
CTAACCTGTA GATTGATGCG ATTTCTTTAA TGTCAATATT TATTATGTAT

ALVAC Right Arm Flanking Sequence

501 ATGGATTTTG TTATCATCAG TTATATTTAA CATAAGTACA ATAAAAAGTA
TACCTAAAAC AATAGTAGTC AATATAAATT GTATTCATGT TATTTTTCAT

Right Arm Donor Plasmid

ALVAC Right Arm Flanking Sequence

551 TTAAATAAAA ATACTTACTT ACGAAAAAAT GACTAATTAG CTATAAAAAC
AATTTATTTT TATGAATGAA TGCTTTTTTA CTGATTAATC GATATTTTTG

VQ Mark

Right Arm Donor Plasmid

601 CCGGGTTAAT TAATTAGTTA TTAGACAAGG TGAAAACGAA ACTATTTGTA
GGCCCAATTA ATTAATCAAT AATCTGTTCC ACTTTTGCTT TGATAAACAT

VQ Mark

Vaccinia H6 Promoter

651 GCTTAATTAA TTAGAGCTTC TTTATTCTAT ACTTAAAAAG TGAAAATAAA
CGAATTAATT AATCTCGAAG AAATAAGATA TGAATTTTTC ACTTTTATTT

Vaccinia H6 Promoter

701 TACAAAGGTT CTTGAGGGTT GTGTTAAATT GAAAGCGAGA AATAATCATA
ATGTTTCCAA GAACTCCCAA CACAATTTAA CTTTCGCTCT TTATTAGTAT

Human B7.1 Coding Region

Vaccinia H6 Promoter

751 AATTATTTCA TTATCGCGAT ATCCGTTAAG TTTGTATCGT AATGGGCCAC
TTAATAAAGT AATAGCGCTA TAGGCAATTC AAACATAGCA TTACCCGGTG

Human B7.1 Coding Region

801 ACACGGAGGC AGGGAACATC ACCATCCAAG TGTCCATACC TCAATTTCTT
TGTGCCTCCG TCCCTTGTAG TGGTAGGTTC ACAGGTATGG AGTTAAAGAA

Human B7.1 Coding Region

851 TCAGCTCTTG GTGCTGGCTG GTCTTTCTCA CTTCTGTTCA GGTGTTATCC
AGTCGAGAAC CACGACCGAC CAGAAAGAGT GAAGACAAGT CCACAATAGG

Human B7.1 Coding Region

901 ACGTGACCAA GGAAGTGAAA GAAGTGGCAA CGCTGTCCTG TGGTCACAAT
TGCACTGGTT CCTTCACTTT CTTCACCGTT GCGACAGGAC ACCAGTGTTA

Human B7.1 Coding Region

951 GTTTCTGTTG AAGAGCTGGC ACAAACTCGC ATCTACTGGC AAAAGGAGAA
CAAAGACAAC TTCTCGACCG TGTTTGAGCG TAGATGACCG TTTTCCTCTT

Human B7.1 Coding Region

1001 GAAAATGGTG CTGACTATGA TGTCTGGAGA CATGAATATA TGGCCCGAGT
CTTTTACCAC GACTGATACT ACAGACCTCT GTACTTATAT ACCGGGCTCA

Human B7.1 Coding Region

1051 ACAAGAACCG GACCATCTTT GATATCACTA ATAACCTCTC CATTGTGATC
TGTTCTTGGC CTGGTAGAAA CTATAGTGAT TATTGGAGAG GTAACACTAG

Human B7.1 Coding Region

1101 CTGGCTCTGC GCCCATCTGA CGAGGGCACA TACGAGTGTG TTGTTCTGAA
GACCGAGACG CGGGTAGACT GCTCCCGTGT ATGCTCACAC AACAAGACTT

Human B7.1 Coding Region

1151 GTATGAAAAA GACGCTTTCA AGCGGGAACA CCTGGCTGAA GTGACGTTAT
CATACTTTTT CTGCGAAAGT TCGCCCTTGT GGACCGACTT CACTGCAATA

Human B7.1 Coding Region

1201 CAGTCAAAGC TGACTTCCCT ACACCTAGTA TATCTGACTT TGAAATTCCA
GTCAGTTTCG ACTGAAGGGA TGTGGATCAT ATAGACTGAA ACTTTAAGGT

Human B7.1 Coding Region

1251 ACTTCTAATA TTAGAAGGAT AATTTGCTCA ACCTCTGGAG GTTTTCCAGA
TGAAGATTAT AATCTTCCTA TTAAACGAGT TGGAGACCTC CAAAAGGTCT

Human B7.1 Coding Region

1301 GCCTCACCTC TCCTGGTTGG AAAATGGAGA AGAATTAAAT GCCATCAACA
CGGAGTGGAG AGGACCAACC TTTTACCTCT TCTTAATTTA CGGTAGTTGT

Human B7.1 Coding Region

1351 CAACAGTTTC CCAAGATCCT GAAACTGAGC TCTATGCTGT TAGCAGCAAA
GTTGTCAAAG GGTTCTAGGA CTTTGACTCG AGATACGACA ATCGTCGTTT

Human B7.1 Coding Region

1401 CTGGATTTCA ATATGACAAC CAACCACAGC TTCATGTGTC TCATCAAGTA
GACCTAAAGT TATACTGTTG GTTGGTGTCG AAGTACACAG AGTAGTTCAT

Human B7.1 Coding Region

1451 TGGACATTTA AGAGTGAATC AGACCTTCAA CTGGAATACA ACCAAGCAAG
ACCTGTAAAT TCTCACTTAG TCTGGAAGTT GACCTTATGT TGGTTCGTTC

Human B7.1 Coding Region

1501 AGCATTTTCC TGATAACCTG CTCCCATCCT GGGCCATTAC CTTAATCTCA
TCGTAAAAGG ACTATTGGAC GAGGGTAGGA CCCGGTAATG GAATTAGAGT

Human B7.1 Coding Region

1551 GTAAATGGAA TTTTCGTGAT ATGCTGCCTG ACCTACTGCT TTGCCCCACG
CATTTACCTT AAAAGCACTA TACGACGGAC TGGATGACGA AACGGGGTGC

Human B7.1 Coding Region

1601 CTGCAGAGAG AGAAGGAGGA ATGAGAGATT GAGAAGGGAA AGTGTACGTC
GACGTCTCTC TCTTCCTCCT TACTCTCTAA CTCTTCCCTT TCACATGCAG

Left Arm Donor Plasmid

Human B7.1 Coding Region

1651 CTGTATAATT TTTATCTCGA GCCCGGGAAG CTTGAATTCT TTTTATTGAT
GACATATTAA AAATAGAGCT CGGGCCCTTC GAACTTAAGA AAAATAACTA

ALVAC Left Arm Flanking Sequence

Left Arm Donor Plasmid

1701 TAACTAGTCA AATGAGTATA TATAATTGAA AAAGTAAAAT ATAAATCATA
ATTGATCAGT TTACTCATAT ATATTAACTT TTTCATTTTA TATTTAGTAT

ALVAC Left Arm Flanking Sequence

1751 TAATAATGAA ACGAAATATC AGTAATAGAC AGGAACTGGC AGATTCTTCT
ATTATTACTT TGCTTTATAG TCATTATCTG TCCTTGACCG TCTAAGAAGA

ALVAC Left Arm Flanking Sequence

1801 TCTAATGAAG TAAGTACTGC TAAATCTCCA AAATTAGATA AAAATGATAC
AGATTACTTC ATTCATGACG ATTTAGAGGT TTTAATCTAT TTTTACTATG

ALVAC Left Arm Flanking Sequence

1851 AGCAAATACA GCTTCATTCA ACGAATTACC TTTTAATTTT TTCAGACACA
TCGTTTATGT CGAAGTAAGT TGCTTAATGG AAAATTAAAA AAGTCTGTGT

ALVAC Left Arm Flanking Sequence

1901 CCTTATTACA AACTAACTAA GTCAGATGAT GAGAAAGTAA ATATAAATTT
GGAATAATGT TTGATTGATT CAGTCTACTA CTCTTTCATT TATATTTAAA

ALVAC Left Arm Flanking Sequence

1951 AACTTATGGG TATAATATAA TAAAGATTCA TGATATTAAT AATTTACTTA
TTGAATACCC ATATTATATT ATTTCTAAGT ACTATAATTA TTAAATGAAT

ALVAC Left Arm Flanking Sequence

2001 ACGATGTTAA TAGACTTATT CCATCAACCC CTTCAAACCT TTCTGGATAT
TGCTACAATT ATCTGAATAA GGTAGTTGGG GAAGTTTGGA AAGACCTATA

ALVAC Left Arm Flanking Sequence

2051 TATAAAATAC CAGTTAATGA TATTAAAATA GATTGTTTAA GAGATGTAAA
ATATTTTATG GTCAATTACT ATAATTTTAT CTAACAAATT CTCTACATTT

ALVAC Left Arm Flanking Sequence

2101 TAATTATTTG GAGGTAAAGG ATATAAAATT AGTCTATCTT TCACATGGAA
ATTAATAAAC CTCCATTTCC TATATTTTAA TCAGATAGAA AGTGTACCTT

ALVAC Left Arm Flanking Sequence

2151 ATGAATTACC TAATATTAAT AATTATGATA GGAATTTTTT AGGATTTACA
TACTTAATGG ATTATAATTA TTAATACTAT CCTTAAAAAA TCCTAAATGT

ALVAC Left Arm Flanking Sequence

2201 GCTGTTATAT GTATCAACAA TACAGGCAGA TCTATGGTTA TGGTAAAACA
CGACAATATA CATAGTTGTT ATGTCCGTCT AGATACCAAT ACCATTTTGT

ALVAC Left Arm Flanking Sequence

2251 CTGTAACGGG AAGCAGCAT
GACATTGCCC TTCGTCGTA

FIGURE 13

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
1   ATATTATTAA AACTATTAGA TAACATAGCT TTATGTAAAG GAGTATTTCC
    TATAATAATT TTGATAATCT ATTGTATCGA AATACATTTC CTCATAAAGG
```

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
51  AGATAACTTA GCTTTAGCAT TTACGTAAGC ACCGTGGTCA AGTAAGAGTT
    TCTATTGAAT CGAAATCGTA AATGCATTCG TGGCACCAGT TCATTCTCAA
```

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
101 TAACAAATTC TGTTTTCATA GAACTAACTG CCATGTATAG AGGAGTGAAA
    ATTGTTTAAG ACAAAAGTAT CTTGATTGAC GGTACATATC TCCTCACTTT
```

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
151 CCTTTATGAT TATAGACGTT TACATAGCAA CCATATAATA AGATCGCATT
    GGAAATACTA ATATCTGCAA ATGTATCGTT GGTATATTAT TCTAGCGTAA
```

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
201 CAGTATATTA ATATCTTTCA TTTCTATAGC TATGTGAATA ACATGTTTAT
    GTCATATAAT TATAGAAAGT AAAGATATCG ATACACTTAT TGTACAAATA
```

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
251 CTAATCCTAC CAACTTTGTA TCAGTACCGT ACTTCAGTAA TAAGTTTACT
    GATTAGGATG GTTGAAACAT AGTCATGGCA TGAAGTCATT ATTCAAATGA
```

C3R Arm

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
301 ATAGTTTTGT TTTTAGATGC AACAGCTATA TTTAGAACGG TATCTATATG
    TATCAAAACA AAAATCTACG TTGTCGATAT AAATCTTGCC ATAGATATAC
```

```
                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
351     ATTATTAACC ACATTAACAT TAGATCCTCT TTCTAAAAGT GTCTTTGTTG
        TAATAATTGG TGTAATTGTA ATCTAGGAGA AAGATTTTCA CAGAAACAAC
                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
401     TTTCGATATC GTTACGTGAA ACAGCGTAAT GTAAGGGACT GCCCATACAG
        AAAGCTATAG CAATGCACTT TGTCGCATTA CATTCCCTGA CGGGTATGTC

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
451     TCATCTATTA CGTTTATATC AGCTCCTAGA TTTAACAGAA GTGCTGTTAC
        AGTAGATAAT GCAAATATAG TCGAGGATCT AAATTGTCTT CACGACAATG

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
501     ATCTTTTCTT CTATTAATTA CCGAATGATG TAATGGGGTT TTACCTAAAT
        TAGAAAAGAA GATAATTAAT GGCTTACTAC ATTACCCCAA AATGGATTTA

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
551     CATCTTGTTC GTTTATAGGC ACTCCGTGAT TTATAAGTAA CGCTATTATA
        GTAGAACAAG CAAATATCCG TGAGGCACTA AATATTCATT GCGATAATAT

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
601     TCGTAACTAC AATTATTTTT AAGTGCCTTT ATGAGATACT GTTTATGCAA
        AGCATTGATG TTAATAAAAA TTCACGGAAA TACTCTATGA CAAATACGTT

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
651     AAATAAACTT TTATCTATTT TAATACTATT ATCTAACAAT ATCCTAATTA
        TTTATTTGAA AATAGATAAA ATTATGATAA TAGATTGTTA TAGGATTAAT

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
701     AATCTATATT CTTATACTTT ATAGCGTAAT GTAACGGAGT TTCAAAATTT
        TTAGATATAA GAATATGAAA TATCGCATTA CATTGCCTCA AAGTTTTAAA

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
751     CTAGTTTGTA TATTAAGATC AATATTAAAA TCTATAAATA TTTTATACAT
        GATCAAACAT ATAATTCTAG TTATAATTTT AGATATTTAT AAAATATGTA

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
801     ATCATCAGAT ATCTTATCAT ACAGTACATC GTAATAATTT AGAAAGAATC
        TAGTAGTCTA TAGAATAGTA TGTCATGTAG CATTATTAAA TCTTTCTTAG

                                C3R Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
851     TATTACAATT AACACCTTTT TTTAATAAAT ATCTAGTTAA TGACTTATTG
        ATAATGTTAA TTGTGGAAAA AAATTATTTA TAGATCAATT ACTGAATAAC
```

C3R Arm
~~~~~~
901 TTTCTATATA CAGAAATATA TAACGGACTA TTTCCAGAAT GTATCTGTTC
AAAGATATAT GTCTTTATAT ATTGCCTGAT AAAGGTCTTA CATAGACAAG

C3R Arm
~~~~~~
951 TATGTCAGCG CCAGAATCTA TTAGTAGTTT AGCAATTTCT GTATTATCTA
ATACAGTCGC GGTCTTAGAT AATCATCAAA TCGTTAAAGA CATAATAGAT

C3R Arm
~~~~~~
1001 AACTAGCAGC TTTATGAAGA GGAGGATTTT TACATTTTAA AATATCGGCA
TTGATCGTCG AAATACTTCT CCTCCTAAAA ATGTAAAATT TTATAGCCGT

C3R Arm
~~~~~~
1051 CCGTGTTCTA GTAATAATTT TACCATTTCT ATATCAGAAA TACTTACGGC
GGCACAAGAT CATTATTAAA ATGGTAAAGA TATAGTCTTT ATGAATGCCG

C3R Arm
~~~~~~
1101 TAAATACAAA GACGTTGATA GTATATTTAC GTTATTGTAT TTGCATTTTT
ATTTATGTTT CTGCAACTAT CATATAAATG CAATAACATA AACGTAAAAA

C3R Arm
~~~~~~
1151 TAAGTATATA CCTTACTAAA TTTATATCTC TATACCTTAT AGCTTTATGC
ATTCATATAT GGAATGATTT AAATATAGAG ATATGGAATA TCGAAATACG

C3R Arm
~~~~~~
1201 AGTTCATTTA TAAGTCTTCC ATTACTCATT TCTGGTAATG AAGTATTATA
TCAAGTAAAT ATTCAGAAGG TAATGAGTAA AGACCATTAC TTCATAATAT

C3R Arm
~~~~~~
1251 TATCATTATG ATATTATCTC TATTTTATTC TAATAAAAAC CGTTATCATG
ATAGTAATAC TATAATAGAG ATAAAATAAG ATTATTTTTG GCAATAGTAC

C3R Arm
~~~~~~
1301 TTATTTATTA TTTGTTATAA TTATACTATT TAATAAATTA TACCAAATAC
AATAAATAAT AAACAATATT AATATGATAA ATTATTTAAT ATGGTTTATG

C3R Arm
~~~~~~
1351 TTAGATACTT ATTAATACCA TCCTAGAACT TGTATTTCTT GCCCCCTAAA
AATCTATGAA TAATTATGGT AGGATCTTGA ACATAAAGAA CGGGGGATTT

C3R Arm
~~~~~~
1401 CTTGGACATG CACTCCATTA GGCGTTTCTT GTTTTCGACA TCGTCCTCCT
GAACCTGTAC GTGAGGTAAT CCGCAAAGAA CAAAAGCTGT AGCAGGAGGA
~~~~~~

C3R Arm
~~~~~~
1451 TAACATATCC TACTGTTATG TGAGGATTCC ACGGATTATC TACTGTGATA
ATTGTATAGG ATGACAATAC ACTCCTAAGG TGCCTAATAG ATGACACTAT

C3R Arm
~~~~~~
1501 TCACCAAACA CGTCCTTCGA ACAGGGTACC GCATTCAGCA GAACATTTCT
AGTGGTTTGT GCAGGAAGCT TGTCCCATGG CGTAAGTCGT CTTGTAAAGA

C3R Arm
~~~~~~
1551 TAGGGCTCTA AGTTCATCAG ATACCTCCAG TTTCATAACT ACAGCGCATC
ATCCCGAGAT TCAAGTAGTC TATGGAGGTC AAAGTATTGA TGTCGCGTAG

C3R Arm
~~~~~~
1601 CTTTCGCTCC CAACTGTTTA GAGGCGTTAC TCTGAGGAAA ACACATCTCT
GAAAGCGAGG GTTGACAAAT CTCCGCAATG AGACTCCTTT TGTGTAGAGA

C3R Arm
~~~~~~
1651 TCTTTACAGA CTATAGAAAT AGTCTGTAAA TCTTGATCAG TTATTTGCTT
AGAAATGTCT GATATCTTTA TCAGACATTT AGAACTAGTC AATAAACGAA

C3R Arm
~~~~~~
1701 TTTGAAATTT TCAAATCTAT CACATTGATC CATATTTGCT ATTCCAAGAG
AAACTTTAAA AGTTTAGATA GTGTAACTAG GTATAAACGA TAAGGTTCTC

C3R Arm
~~~~~~
1751 TTATATGAGG AAAAATATCA CATCCTGTCA TGTATTTTAT TGTAACATTA
AATATACTCC TTTTTATAGT GTAGGACAGT ACATAAAATA ACATTGTAAT

C3R Arm
~~~~~~
1801 TTATAATCTG TAACATCAGT ATCTAACCTA ACGTCGTAAA AGTTAACAGA
AATATTAGAC ATTGTAGTCA TAGATTGGAT TGCAGCATTT TCAATTGTCT

C3R Arm
~~~~~~
1851 TGCCCAGTTA CTATAATCCC AAGGAACCTT AACATCTAAT CCCATTAAAA
ACGGGTCAAT GATATTAGGG TTCCTTGGAA TTGTAGATTA GGGTAATTTT

C3R Arm
~~~~~~
1901 TAGTATCCTT TCTACTATTT TTTTCATTGG CAAGTATGTG GCTTAGTTTA
ATCATAGGAA AGATGATAAA AAAAGTAACC GTTCATACAC CGAATCAAAT

C3R Arm
~~~~~~
1951 CACAAAATTC CTGCCATTTT GTAACGATAG CGAAGCAATA GCTTGTATGC
GTGTTTTAAG GACGGTAAAA CATTGCTATC GCTTCGTTAT CGAACATACG
~~~~~~

```
                                                      H6 promoter
                                                    ~~~~~~~~~~~~~~
2001   TTTTTATTTG ATTAACTAGT CATAAAAATC GGGATCCTTC TTTATTCTAT
       AAAAATAAAC TAATTGATCA GTATTTTTAG CCCTAGGAAG AAATAAGATA

                           H6 promoter
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2051   ACTTAAAAAG TGAAAATAAA TACAAAGGTT CTTGAGGGTT GTGTTAAATT
       TGAATTTTTC ACTTTTATTT ATGTTTCCAA GAACTCCCAA CACAATTTAA

                           H6 promoter
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2101   GAAAGCGAGA AATAATCATA AATTATTTCA TTATCGCGAT ATCCGTTAAG
       CTTTCGCTCT TTATTAGTAT TTAATAAAGT AATAGCGCTA TAGGCAATTC

                                      MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
       H6 promoter
       ~~~~~~~~~~~~
2151   TTTGTATCGT AATGGAGTCT CCCTCGGCCC CTCCCCACAG ATGGTGCATC
       AAACATAGCA TTACCTCAGA GGGAGCCGGG GAGGGGTGTC TACCACGTAG

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2201   CCCTGGCAGA GGCTCCTGCT CACAGCCTCA CTTCTAACCT TCTGGAACCC
       GGGACCGTCT CCGAGGACGA GTGTCGGAGT GAAGATTGGA AGACCTTGGG

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2251   GCCCACCACT GCCAAGCTCA CTATTGAATC CACGCCGTTC AATGTCGCAG
       CGGGTGGTGA CGGTTCGAGT GATAACTTAG GTGCGGCAAG TTACAGCGTC

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2301   AGGGGAAGGA GGTGCTTCTA CTTGTCCACA ATCTGCCCCA GCATCTTTTT
       TCCCCTTCCT CCACGAAGAT GAACAGGTGT TAGACGGGGT CGTAGAAAAA

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2351   GGCTACAGCT GGTACAAAGG TGAAAGAGTG GATGGCAACC GTCAAATTAT
       CCGATGTCGA CCATGTTTCC ACTTTCTCAC CTACCGTTGG CAGTTTAATA

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2401   AGGATATGTA ATAGGAACTC AACAAGCTAC CCCAGGGCCC GCATACAGTG
       TCCTATACAT TATCCTTGAG TTGTTCGATG GGGTCCCGGG CGTATGTCAC

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2451   GTCGAGAGAT AATATACCCC AATGCATCCC TGCTGATCCA GAACATCATC
       CAGCTCTCTA TTATATGGGG TTACGTAGGG ACGACTAGGT CTTGTAGTAG

                               MCEA
       ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2501   CAGAATGACA CAGGATTCTA CACCCTACAC GTCATAAAGT CAGATCTTGT
       GTCTTACTGT GTCCTAAGAT GTGGGATGTG CAGTATTTCA GTCTAGAACA
```

```
                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2551    GAATGAAGAA GCAACTGGCC AGTTCCGGGT ATACCCGGAA CTCCCTAAGC
        CTTACTTCTT CGTTGACCGG TCAAGGCCCA TATGGGCCTT GAGGGATTCG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2601    CTTCTATTAG CTCCAATAAT AGTAAGCCTG TCGAAGACAA AGATGCCGTC
        GAAGATAATC GAGGTTATTA TCATTCGGAC AGCTTCTGTT TCTACGGCAG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2651    GCTTTTACAT GCGAGCCCGA AACTCAAGAC GCAACATATC TCTGGTGGGT
        CGAAAATGTA CGCTCGGGCT TTGAGTTCTG CGTTGTATAG AGACCACCCA

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2701    GAACAACCAG TCCCTGCCTG TGTCCCCTAG ACTCCAACTC AGCAACGGAA
        CTTGTTGGTC AGGGACGGAC ACAGGGGATC TGAGGTTGAG TCGTTGCCTT

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2751    ATAGAACTCT GACCCTGTTT AACGTGACCA GGAACGACAC AGCAAGCTAC
        TATCTTGAGA CTGGGACAAA TTGCACTGGT CCTTGCTGTG TCGTTCGATG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2801    AAATGCGAAA CCCAAAATCC AGTCAGCGCC AGGAGGTCTG ATTCAGTGAT
        TTTACGCTTT GGGTTTTAGG TCAGTCGCGG TCCTCCAGAC TAAGTCACTA

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2851    TCTCAACGTG CTTTACGGAC CCGATGCTCC TACAATCAGC CCTCTAAACA
        AGAGTTGCAC GAAATGCCTG GGCTACGAGG ATGTTAGTCG GGAGATTTGT

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2901    CAAGCTATAG ATCAGGGGAA AATCTGAATC TGAGCTGTCA TGCCGCTAGC
        GTTCGATATC TAGTCCCCTT TTAGACTTAG ACTCGACAGT ACGGCGATCG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
2951    AATCCTCCCG CCCAATACAG CTGGTTTGTC AATGGCACTT TCCAACAGTC
        TTAGGAGGGC GGGTTATGTC GACCAAACAG TTACCGTGAA AGGTTGTCAG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3001    CACCCAGGAA CTGTTCATTC CCAATATTAC CGTGAACAAT AGTGGATCCT
        GTGGGTCCTT GACAAGTAAG GGTTATAATG GCACTTGTTA TCACCTAGGA

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3051    ACACGTGCCA AGCTCACAAT AGCGACACCG GACTCAACCG CACAACCGTG
        TGTGCACGGT TCGAGTGTTA TCGCTGTGGC CTGAGTTGGC GTGTTGGCAC
```

```
                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3101    ACGACGATTA CCGTGTATGA GCCACCAAAA CCATTCATAA CTAGTAACAA
        TGCTGCTAAT GGCACATACT CGGTGGTTTT GGTAAGTATT GATCATTGTT

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3151    TTCTAACCCA GTTGAGGATG AGGACGCAGT TGCATTAACT TGTGAGCCAG
        AAGATTGGGT CAACTCCTAC TCCTGCGTCA ACGTAATTGA ACACTCGGTC

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3201    AGATTCAAAA TACCACTTAT TTATGGTGGG TCAATAACCA AAGTTTGCCG
        TCTAAGTTTT ATGGTGAATA AATACCACCC AGTTATTGGT TTCAAACGGC

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3251    GTTAGCCCAC GCTTGCAGTT GTCTAATGAT AACCGCACAT TGACACTCCT
        CAATCGGGTG CGAACGTCAA CAGATTACTA TTGGCGTGTA ACTGTGAGGA

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3301    GTCCGTTACT CGCAATGATG TAGGACCTTA TGAGTGTGGC ATTCAGAATG
        CAGGCAATGA GCGTTACTAC ATCCTGGAAT ACTCACACCG TAAGTCTTAC

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3351    AATTATCCGT TGATCACTCC GACCCTGTTA TCCTTAATGT TTTGTATGGC
        TTAATAGGCA ACTAGTGAGG CTGGGACAAT AGGAATTACA AAACATACCG

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3401    CCAGACGACC CAACTATATC TCCATCATAC ACCTACTACC GTCCCGGCGT
        GGTCTGCTGG GTTGATATAG AGGTAGTATG TGGATGATGG CAGGGCCGCA

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3451    GAACTTGAGC CTTTCTTGCC ATGCAGCATC CAACCCCCCT GCACAGTACT
        CTTGAACTCG GAAAGAACGG TACGTCGTAG GTTGGGGGGA CGTGTCATGA

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3501    CCTGGCTGAT TGATGGAAAC ATTCAGCAGC ATACTCAAGA GTTATTTATA
        GGACCGACTA ACTACCTTTG TAAGTCGTCG TATGAGTTCT CAATAAATAT

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3551    AGCAACATAA CTGAGAAGAA CAGCGGACTC TATACTTGCC AGGCCAATAA
        TCGTTGTATT GACTCTTCTT GTCGCCTGAG ATATGAACGG TCCGGTTATT

                                    MCEA
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3601    CTCAGCCAGT GGTCACAGCA GGACTACAGT TAAAACAATA ACTGTTTCCG
        GAGTCGGTCA CCAGTGTCGT CCTGATGTCA ATTTTGTTAT TGACAAAGGC
```

```
                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3651    CGGAGCTGCC CAAGCCCTCC ATCTCCAGCA ACAACTCCAA ACCCGTGGAG
        GCCTCGACGG GTTCGGGAGG TAGAGGTCGT TGTTGAGGTT TGGGCACCTC

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3701    GACAAGGATG CTGTGGCCTT CACCTGTGAA CCTGAGGCTC AGAACACAAC
        CTGTTCCTAC GACACCGGAA GTGGACACTT GGACTCCGAG TCTTGTGTTG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3751    CTACCTGTGG TGGGTAAATG GTCAGAGCCT CCCAGTCAGT CCCAGGCTGC
        GATGGACACC ACCCATTTAC CAGTCTCGGA GGGTCAGTCA GGGTCCGACG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3801    AGCTGTCCAA TGGCAACAGG ACCCTCACTC TATTCAATGT CACAAGAAAT
        TCGACAGGTT ACCGTTGTCC TGGGAGTGAG ATAAGTTACA GTGTTCTTTA

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3851    GACGCAAGAG CCTATGTATG TGGAATCCAG AACTCAGTGA GTGCAAACCG
        CTGCGTTCTC GGATACATAC ACCTTAGGTC TTGAGTCACT CACGTTTGGC

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3901    CAGTGACCCA GTCACCCTGG ATGTCCTCTA TGGGCCGGAC ACCCCCATCA
        GTCACTGGGT CAGTGGGACC TACAGGAGAT ACCCGGCCTG TGGGGGTAGT

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3951    TTTCCCCCCC AGACTCGTCT TACCTTTCGG GAGCGAACCT CAACCTCTCC
        AAAGGGGGGG TCTGAGCAGA ATGGAAAGCC CTCGCTTGGA GTTGGAGAGG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4001    TGCCACTCGG CCTCTAACCC ATCCCCGCAG TATTCTTGGC GTATCAATGG
        ACGGTGAGCC GGAGATTGGG TAGGGGCGTC ATAAGAACCG CATAGTTACC

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4051    GATACCGCAG CAACACACAC AAGTTCTCTT TATCGCCAAA ATCACGCCAA
        CTATGGCGTC GTTGTGTGTG TTCAAGAGAA ATAGCGGTTT TAGTGCGGTT

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4101    ATAATAACGG GACCTATGCC TGTTTTGTCT CTAACTTGGC TACTGGCCGC
        TATTATTGCC CTGGATACGG ACAAAACAGA GATTGAACCG ATGACCGGCG

                                    MCEA
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4151    AATAATTCCA TAGTCAAGAG CATCACAGTC TCTGCATCTG GAACTTCTCC
        TTATTAAGGT ATCAGTTCTC GTAGTGTCAG AGACGTAGAC CTTGAAGAGG
```

```
                                    MCEA
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4201      TGGTCTCTCA GCTGGGGCCA CTGTCGGCAT CATGATTGGA GTGCTGGTTG
          ACCAGAGAGT CGACCCCGGT GACAGCCGTA GTACTAACCT CACGACCAAC

                MCEA
          ~~~~~~~~~~~~~~~~~~~
4251      GGGTTGCTCT GATATAGTTT TTATCTCGAG GAATTCCTGC AGCCCGGGTT
          CCCAACGAGA CTATATCAAA AATAGAGCTC CTTAAGGACG TCGGGCCCAA

                                          C3L Arm
                                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4301      TTTATAGCTA ATTAGTCAAA TGTGAGTTAA TATTAGTATA CTACATTACT
          AAATATCGAT TAATCAGTTT ACACTCAATT ATAATCATAT GATGTAATGA

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4351      AATTTATTAC ATATTCATTT ATATCAATCT AGTAGCATTT AGCTTTTATA
          TTAAATAATG TATAAGTAAA TATAGTTAGA TCATCGTAAA TCGAAAATAT

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4401      AAACAATATA ACTGAATAGT ACATACTTTA CTAATAAGTT ATAAATAAGA
          TTTGTTATAT TGACTTATCA TGTATGAAAT GATTATTCAA TATTTATTCT

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4451      GATACATATT TATAGTATTT TACTTTCTAC ACTGAATATA ATAATATAAT
          CTATGTATAA ATATCATAAA ATGAAAGATG TGACTTATAT TATTATATTA

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4501      TATACAAATA TAATTTTTAA TACTATATAG TATATAACTG AAATAAAATA
          ATATGTTTAT ATTAAAAATT ATGATATATC ATATATTGAC TTTATTTTAT

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4551      CCAGTGTAAT ATAGTTATTA TACATTTATA CCACATCAAA GATGAGTTAT
          GGTCACATTA TATCAATAAT ATGTAAATAT GGTGTAGTTT CTACTCAATA

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4601      AACATCAGTG TCACTGTTAG CAACAGTAGT TATACGATGA GTAGTTACTC
          TTGTAGTCAC AGTGACAATC GTTGTCATCA ATATGCTACT CATCAATGAG

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4651      TCGTATGGCG TTAGTATGTA TGTATCTTCT AGTTTTCTTA GTAGGCATTA
          AGCATACCGC AATCATACAT ACATAGAAGA TCAAAAGAAT CATCCGTAAT

                                C3L Arm
          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4701      TAGGAAACGT CAAGCTTATA AGGTTATTAA TGGTATCTAG AAATATATCT
          ATCCTTTGCA GTTCGAATAT TCCAATAATT ACCATAGATC TTTATATAGA
```

```
                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4751    ATTATACCGT TTCTCAACTT GGGAATAGCC GATTTGCTGT TTGTGATATT
        TAATATGGCA AAGAGTTGAA CCCTTATCGG CTAAACGACA AACACTATAA

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4801    CATACCTTTA TACATTATAT ACATACTAAG TAATTTCCAT TGGCATTTTG
        GTATGGAAAT ATGTAATATA TGTATGATTC ATTAAAGGTA ACCGTAAAAC

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4851    GTAAAGCACT TTGTAAAATT AGTTCTTTCT TTTTTACTTC TAACATGTTT
        CATTTCGTGA AACATTTTAA TCAAGAAAGA AAAAATGAAG ATTGTACAAA

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4901    GCAAGTATAT TTTTAATAAC TGTAATAAGC GTATATAGAT ATGTAAAAAT
        CGTTCATATA AAAATTATTG ACATTATTCG CATATATCTA TACATTTTTA

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4951    TACCCTTCCT GGATTTACCT ATAAATATGT TAACATTAGA AATATGTACA
        ATGGGAAGGA CCTAAATGGA TATTTATACA ATTGTAATCT TTATACATGT

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
5001    TTACTATATT TTTCATATGG ATTATTTCTA TTATACTAGG GATTCCTGCT
        AATGATATAA AAAGTATACC TAATAAAGAT AATATGATCC CTAAGGACGA

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
5051    CTTTACTTTA GAAATACTAT CGTAACAAAA AATAACGACA CGCTGTGTAT
        GAAATGAAAT CTTTATGATA GCATTGTTTT TTATTGCTGT GCGACACATA

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
5101    TAATCATTAT CATGATAATA GAGAAATTGC TGAATTGATT TACAAAGTTA
        ATTAGTAATA GTACTATTAT CTCTTTAACG ACTTAACTAA ATGTTTCAAT

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
5151    TTATCTGTAT CAGATTTATT TTAGGATACC TACTACCTAC GATAATTATA
        AATAGACATA GTCTAAATAA AATCCTATGG ATGATGGATG CTATTAATAT

                                   C3L Arm
                ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
5201    CTCGTATGCT ATACGTTACT GATCTACAGA ACTAACAATG CATGTCGACG
        GAGCATACGA TATGCAATGA CTAGATGTCT TGATTGTTAC GTACAGCTGC

                C3L Arm
                ~~~~~~
5251    CGGCCGCAA
        GCCGGCGTT
```